PROCEEDINGS of the HUMAN FACTORS SOCIETY 26th ANNUAL MEETING–1982

PRESIDENTIAL ADDRESS

The Human Factors Society at the Quarter-Century Mark 1
William B. Knowles

INVITED PRESENTATION

Roots: The Human Factors Society at the Zero Mark ..... **
Arnold M. Small

TRAINING STRATEGIES AND SKILL ACQUISITION

Quarterbacks as Cornerbacks or American Fighter Pilots in MIGS: A Study of Reverse Role Training 6
K. Ronald Laughery, Jr.

Training Spatial Skills for Air-Traffic Control 10
Walter Schneider
Michael Vidulich
Yei-Yu Yeh

Team Performance and Training for Team Competition 15
Jean L. Dyer
Pamela V. Mays
Robert H. Bennett

The Development of an Accurate Internal Model for High Order Systems 20*
Ray E. Eberts

Yoked Design and Secondary Task in Adaptive Training 21
David F. Johnson
Robert C. Haygood
William M. Olson

Flying Ability and Understanding of Vehicle Control Dynamics 25
Joe De Maio

INDUSTRIAL ERGONOMICS: TOOLS AND TECHNIQUES

Human Factors Problems in Heavy Manufacturing as Perceived by Manufacturing Engineers 30
S. Keith Adams

Rater Fatigue in Job Analysis Surveys 35
Edmond W. Israelski
Jill S. Lenoble

Evaluation of Control Station Design: The Crew Human Engineering Software System 40
Roger J. Jones
Gordon L. Jonsen
C.C. Van

An Empirical Investigation of Ergonomics in the International Retail Workstations 44
Mark S. Hoffman

Evaluating Options for CRT Display of Process Trend Data 49
Christopher G. Koch
Thomas R. Edman
R. Kim Guenther

The Effect of Graphic Input Devices on Performance in a Cursor Positioning Task 54
Alan E. Albert

COMPUTER SYSTEMS: ELECTRONIC FILING

Human Aspects of Office Filing: Implications for the Electronic Office 59
I. Cole

Office Automation and Managerial Productivity: Some Issues 64
Susan M. Evans
Dev S. Kochhar

Effect of Interface Design on Usability of Message Handling Systems 69
Nancy C. Goodwin

An On-Line Experimental Comparison of Two Simulated Record Selection Languages 74
Kevin F. Bury
James M. Boyle

Computer-Augmented Retrieval of HELP Information for Novice Users 79
Andrew M. Cohill
Robert C. Williges

Strategies of Interactive File Search 83
Jay Elkerton
Robert C. Williges
James A. Pittman
John Roach

Interface Design for CIRS (Corporate Information Retrieval System) ..... **
Joel Shechter

*Abstract Only
**Manuscript Not Available For Publication

WARNING MESSAGES AND PICTORIALS

Picture Recognition: A Human Factors Study of Four Illustration Types 87*
Lois E. Flamm
Catherine R. Marshall

Some Performance Correlates of Technical Illustration Level 88
Douglas G. Hoecker

The Effects of Warning Message Highlighting on Novel Assembly Task Performance 93
Morris A. Zlotnik

Warnings on Consumer Products: Objective Criteria for Their Use 98
Roger L. McCarthy
J. Neil Robinson
James P. Finnegan
Robert K. Taylor

Navigation Through Hierarchical Menu Structures: Does it Help to Have a Map? 103
Patricia A. Billingsley

Evaluation of Symbols for Construction Machines ..... **
M.G. Helander
J.M. Schurick

ENVIRONMENTAL DESIGN: CHAIRS AND COOLING

Schema Pointer Plus Tag Model and Interior Design 108
Andrew D. Cohen

Thermal Comfort as Affected by Chair Style and Covering 113
Frederick H. Rohles, Jr.
Rachel J. Krohn

Enhancing Thermal Comfort with Ceiling Fans 118
Frederick H. Rohles, Jr.
Stephan A. Konz
Byron W. Jones

Cooling with Box Fans 123
Eric Rosen
Stephan Konz

The Effect of Personal Cooling Systems on Performance Under Heat Stress 128
Dan Zakay
Yair Shapiro
Yoram Epstein
Shay Bril

Analysis of Occupant Thermal Comfort Questions Arising from Designing Buildings to Satisfy the City of Seattle Energy Code 132
A.F. Emery
D.R. Heerwagen
C.F. Kippenhan

Mitigation of Performance Decrement in Transient Extreme Heat 137
P.A. Hancock

HUMAN FACTORS EDUCATION: WHAT KIND, WHAT FOR? [PANEL]

Human Factors Education: What Kind, What For? 142
Lewis H. Geyer
Susanne M. Gatchell
Wolf J. Hebenstreit
Stanley N. Roscoe
Harry L. Snyder

HUMAN FACTORS IN WORK ENVIRONMENTS [PANEL]

Human Factors in Work Environments 143
Walter B. Kleeman, Jr.
Francis Duffy
Maria G. Geisey
Gerald Davis
James A. Wise
Sara J. Czaja
Wanda Smith

WORKPLACE DESIGN: VIDEO DISPLAY TERMINALS

Visual, Musculoskeletal, and Performance Differences Between Good and Poor VDT Workstations 144*
M.J. Dainoff
L. Fraser
B.J. Taylor

Evaluating a Multi-User VDT Workstation in a Working Environment 145
Ulrika Wallersteiner

Design Applications for Optimizing the Working Environment of the Software Employee: A Case Study 150
Dennis J. Seal
Gordon E. Sylvester

Human Factors Dimensions in the Evolution of Increasingly Automated Control Rooms for Near-Earth Satellites 155
Christine M. Mitchell

Selecting a Color Monitor for An Interactive Graphics System Used to Design Integrated Circuits 160
Andrew D. Le Cocq

Doing the Same Work with a CRT Terminal and with Hardcopy 165
John D. Gould
Nancy Grischkowsky

*Abstract Only
**Manuscript Not Available For Publication

DESIGNING FOR THE HANDICAPPED

Computer-Aided Prescription of Communication Aids for the Non-Vocal Motor Handicapped 167
Michael J. Rosen
Cheryl Goodenough-Trepagnier

Determinants of Rate in Communication Aids for the Non-Vocal Motor Handicapped 172
Cheryl Goodenough-Trepagnier
Michael J. Rosen
Laura Demsetz

A Study of the Residual Physical Capabilities of Cerebral Palsied Individuals 176
D.H. Liles
Rajiv Kapur

Isokinetic Strength Characteristics of Men Confined to Wheelchairs 181
W.W. Hosler
J.R. Morrow
J. Boelter

Age and Information Processing 184
Jan Moraal

THE RELEVANCE OF POPULATION DIFFERENCES TO HUMAN FACTORS [PANEL]

Relevance of Population Differences to Human Factors 189
Wanda Smith
Thomas H. White
Margaret T. Shaffer
Mark D. Phillips
W.W. Hosler
Miriam Gayle Wardle
Cynthia Jensen

HUMAN FACTORS IN PRODUCT DESIGN: DISC CAMERA

Human Factors, Photographic Space, and Disc Photography 190
T.W. Faulkner
T.M. Rice

Designing New Cameras for Improved Holdability 195
Stanley H. Caplan

Human Factors Evaluations of Logic in **Kodak** Disc Cameras 199
Richard Lucas
Rodney L. Heckaman
Terrence W. Faulkner

HUMAN FACTORS IN ARCHITECTURE: A VIEW FROM THE FIELD [PANEL]

Human Factors in Architecture: A View from the Field 203
James A. Wise
Richard Alden
Sharon K. Griffin
Elaine Day Latourelle
Michael K. Lindell
Rani K. Lueder

HUMAN-COMPUTER INTERACTION THROUGH VOICE TECHNOLOGY

A Model of Task Performance for Voice Controlled Systems ..... **
Eric Werkowitz
David Williamson

Synthesized Voice Warning Messages: Effects of Alerting Cues and Message Environment 204*
Markku T. Hakkinen
Beverly H. Williges

Critical Issues in the Development of Speech Technology for Man-Machine Integration 205*
S. Joy Mountford
Wayne A. Lea

Methodology for Exploring Voice-Interactive Avionics Tasks: Optimizing Interactive Dialogues 207
S. Joy Mountford
R.A. North
S.V. Metz
N. Warner

Human Factors Guidelines for the Use of Synthetic Speech Devices 212
Thomas R. Edman

Toward Speaker Independent Voice Recognition 217*
Gary K. Poock
Norman D. Schwalm
Ellen F. Roland

Voice Input/Output in Perspective 218
Ken Funk
Ed McDowell

The Influence of S-C-R Compatibility and Resource Competition on Performance of Threat Evaluation and Fault Diagnosis 223
Michael Vidulich
Christopher D. Wickens

TRAFFIC SAFETY

Driver Eye Scanning on Curves and on Straight Sections on Rural Highways 227*
Helmut T. Zwahlen

Spectral Analysis of Driver Steering Behavior 228
Samuel P. Sturgis

*Abstract Only
**Manuscript Not Available For Publication

Rural Road Delineation at Night: The Influence of Road-Side Post Location and Frequency on Curve Direction Estimates 233
T.J. Triggs
J.W. Meehan
W.G. Harris

Effects of Side Impact Padding on Driver Performance ..... **
A. Stephen Baum
Valerie J. Gawron
Michael Perel

Driver Skills, Field Dependence, Susceptibility to Illusions and Self-Perception 238*
Judith E. Bergum
Bruce O. Bergum

The Development of a Computer Simulation Model of Driver Performance to Predict Accident Probability 239
Michael Perel

ARMY TRAINING EFFECTIVENESS ANALYSIS: ISSUES AND METHODS

Overview of Training Effectiveness Analysis 244
Gilbert L. Neal

Preliminary Training Effectiveness Analysis of a Conceptual Weapon System 249*
Richard E. Christ

A Forecasting Method for Training Effectiveness Analysis 250
Edward D. Dawdy
John K. Hawley

Training Effectiveness Analysis: Where the Operator Meets the Equipment 255
Anthony J. Maitland

Methodologies for Evaluating Training Products and Processes 258
Richard J. Carter

Estimating Skill Retention From Initial Training 263
Kay E. Rigg
Burl B. Gray
Barry W. Tillman
Jack H. Pryor

HUMAN FACTORS IN THE FOREST PRODUCTS INDUSTRY

Human Factors in the Forest Products Industry 266
J.G. Sublett

Review of Human Factors Applications in Forest Harvesting 271
Leo A. Smith
Donald L. Sirois

A Health Evaluation Study of Kraft Pulp Mill Workers 276
Eric W. Banister
Samia Fadl
Stephen Brown
Nancy Sprince
Christine Oliver
Tom Smith
Gordon Diewert
Joffre Berry

COMPUTER SYSTEMS: POTPOURRI

The Perception of Flicker and Glare on Computer CRT Displays 281
Scott Isensee

A Comparison of VDT Antireflection Treatments 285
James K. Habinek
Peggy M. Jacobson
Win Miller
Thomas W. Suther, III

National Standards for the Design of Visual Display Terminals 290
Richard S. Hirsch

Critique of Methods Employed in Human Factors Research on VDTs 295
Jayne M. Schurick
Martin G. Helander
Patricia A. Billingsley

Design and Evaluation Aids for Interactive Video Disc Systems 300*
J.R. Kornfeld

Of Designers, Artists and Human Engineers: Interactive Microcomputer Graphics as Design Aids 301*
Tyler Blake

A Systems Analysis Approach to Office Automation 302
R. Don Williams

INSTRUMENT SCANNING AND WORKLOAD

Flight Crew Performance When Pilot-Flying and Pilot-Not-Flying Duties Are Exchanged 307
Harry W. Orlady

Optical Variables as Measures of Performance During Simulated Flight 312
Dean H. Owen
Rik Warren

*Abstract Only
**Manuscript Not Available For Publication

Visual/Perceptual Aspects of an F-4G Accident 316
Robert S. Kellogg

The Reliability and Validity of Flight Task Workload Ratings 319
Mary E. Childress
Sandra G. Hart
Michael R. Bortolussi

A Study of Direct Distance Estimations to Familiar Objects in Real-Space, Two-Dimensional, and Stereographic Displays 324
Thomas M. Lippert
David L. Post
Robert J. Beaton

Evaluation of CRT-Displayed Digital Imagery Using Subjective Scaling 329
Betty P. Chao
Robert J. Beaton
Harry L. Snyder

TOOLS FOR HUMAN FACTORS RESEARCH

Representing Human Cognition in Complex Man-Machine Environments 334
Chris R. Hale

The Power Law of Motor Control: Some Diverse Applications 339
Tarald O. Kvalseth

Parametric and Nonparametric Signal Detection Measures: Pros and Cons 344
C. Marlin Brown

Averaged Cross-Correlations with Differentially-Stable Variables: Fewer Subjects Required with Repeated Measures 349
Alvah C. Bittner, Jr.
William P. Dunlap
Marshall B. Jones

Methodology and the Use of Dual and Complex–Task Paradigms in Human Factors Research 354
Phillip L. Ackerman
Christopher D. Wickens

Repeated Measures on a Choice Reaction Time Task 359
Michele Krause

The Hughes Design Analysis System and Instructor Workload in Operational Trainers 364
Andrew D. Cohen

ERGONOMICS IN ARDUOUS OCCUPATIONS

Preemployment Physical Testing for Jobs on Drilling Rigs 369
Kenneth R. Laughery
Andrew S. Jackson

Manual Dexterity Task Performance Efficiency in the Open Ocean Underwater Environment 374
P.A. Hancock
E.K. Milner

A Human Factors Research Program for Underground Metal and Non-Metal Mines 379
Martin G. Helander
James M. Peay

Predictive Relationships for Cab Dimensioning in Low-Coal Mining Machines 384
Ray W. Cooksey
Craig S. Hartley
J. Alton Burks

An Anthropometrically Adjustable Seat for Low Seam Mining Applications 389
Craig S. Hartley
Ray W. Cooksey
August J. Kwitowski

Some Considerations in the Productivity of Potash Mines 394
Dev S. Kochhar
Pat Williston

Glare and Adaptation Effects Caused by the Miner's Caplamp 399*
John O. Merritt
Thomas J. Perry
James M. Peay

CONSUMER PRODUCT RESEARCH AND DESIGN

Productivity and Machine Design: The Case of a Lettering Machine 400
Nicholas M. Simonelli

A Performance Comparison of Japanese and American Hand Saws 403
Ann S. Bleed
Peter Bleed
David J. Cochran
Michael W. Riley

An Evaluation of Handle Shapes and Sizes 408
David J. Cochran
Michael W. Riley

Bent Hammer Handles 413
Rachel Krohn
Stephan Konz

Average Operator Inaction Characteristics with Lever Controls – Study of the Column Mounted Gear Selector Lever 418
Roger L. McCarthy
James P. Finnegan
Graeme F. Fowler
Stuart B. Brown

Perception of the Moment of Inertia of Hand Tools 423*
Carol Zahner
M. Stephen Kaminaka

*Abstract Only
**Manuscript Not Available For Publication

COMPUTER SYSTEMS: KEYBOARDS AND DATA ENTRY DEVICES

Membrane Keyboards and Human Performance 424*
Karen M. Cohen

Thirty Millimeter Keyboards: How Good Are They? 425
William H. Emmons
Richard S. Hirsch

Effect on Operator Performance at Thin Profile Keyboard Slopes of 5°, 10°, 15°, and 25° 430
Thomas W. Suther, III
John H. McTyre

The Use of Touch-Sensitive Human-Computer Interfaces: Behavioral and Design Implications 435*
Dennis B. Beringer
Susan R. Maxwell

Talking Keyboard for User Guidance in Multifunction Systems 436
Georg Geiser
Wilfried Schumacher
Lothar Berger

Design and Specification Issues for Flat Panel and Overlay Switch Person-Computer Interfaces 440*
Lawrence D. Pohlman

AIRCRAFT DISPLAYS RESEARCH

Pilot Visual Behavior as a Function of Navigation and Flight Control Modes in the Boeing 757/767 441
Richard E. Edwards
Philip Tolin
Gordon L. Jonsen

Color Display Formats in the Cockpit: Who Needs Them? 446
John M. Reising
Gloria L. Calhoun

Improved Electronic Warfare Displays for Attack Aircraft 450
Richard J. Farrell
Weslie L. Andres
James D. Gilmour

Computer Generated Pictorial Stores Management Displays for Fighter Aircraft 455
Anthony J. Aretz
Gloria L. Calhoun

Application of a Hybrid OVD/CIG System to Tactical Map Problems 460*
Richard A. Barker
Susan Wilson

Image Interpretation for Soft-Copy Displays of Digitally Derived Images 461
Robert J. Beaton
Betty P. Chao
Harry L. Snyder

COGNITIVE PROCESSES: A POTPOURRI I

Effects of Task Structures on Attention Allocation Optimality 465
Pamela S. Tsang

Fear of Flying: Impact on the U.S. Air Travel Industry 470
Robert D. Dean
Kerry M. Whitaker

Mental Stress Quantification and Identification Decision Modeling 474
Anil Mital
O.M. Ulgen

Changes in Maze-Solving Errors Due to Stress 479
Sharon L. Ward
Richard J. Poturalski

Communication Control and Leadership in Telecommunications by Small Groups 483
Peter D. Pagerey
Alphonse Chapanis

The Effect of Altitude on Absolute Hearing Threshold Levels 488
I.B. Mekjavic
D. Sinclair
D. Steele
N.S. Longridge

SAFETY: A POTPOURRI OF HUMAN FACTORS ISSUES

Human Factors Implications of OSHA's Impact on Small Manufacturers 493
James W. Knight
Douglas J. Harju

Ergonomic Basis of Disabling Injuries in Telephone Workers 498
Thomas J. Smith
Richard Ginnold
Walter Brandl

Design Criteria for Safer Manual Lifting by Men and Women 503
Dudley G. Letbetter

A Work Clothing Design Suitable for the Needs of Low Coal Miners 508
Joseph L. Selan
Doris K. Caddel
M.M. Ayoub
James L. Smith
Jim Peay

*Abstract Only
**Manuscript Not Available For Publication

An Analysis of Residential Table Accidents 512
Patricia R. Carey
William Peter McLeod

Case Study: Ergonomic and Hazard Evaluation of a New Consumer Product 515
Terrence J. Stobbe
Ralph W. Plummer

PHYSIOLOGICAL AND BIOLOGICAL RESEARCH

The Seated Man. Theories and Realities 520
A.C. Mandal

Ergonomic Considerations of Fin Size for Working Divers 525
I.B. Mekjavic
P.A. Rowe
J.B. Morrison

Physiological Effect of Partial Spectrum Lighting on the Human 530
Don A. Zabcik
Stephen B. Hottman

A Methodological Investigation of Subject Input/Output Related Error During Vibration 533
Jeffery C. Woldstad
Alvah C. Bittner, Jr.
John C. Guignard

Chronopsychology, The Human Enterprise and Performance Effectiveness ..... **
Carl E. Englund

COMPUTER SYSTEMS: MENU-BASED DIALOG

Numbering Formats for Hierarchic Lists 538
Sidney L. Smith
Arlene F. Aucella

Search and Decision Processes in Human Interaction with Menu-Driven Systems ..... **
Benjamin L. Somberg
George J. Boggs
Maria C. Picardi

Evaluating Human-Computer Dialog Styles: Command vs. Form/Fill-In for Report Modification 542
William C. Ogden
James M. Boyle

The Effect of Organization on Learning Menu Access 546
Linda S. Liebelt
James E. McDonald
Jim D. Stone
John Karat

Evaluating a Method for Structuring the User-System Interface 551
James E. McDonald
Jim D. Stone
Linda S. Liebelt
John Karat

Memorial Mechanisms in Visual Search of Computer Command Menus ..... **
Stuart K. Card

INDUSTRIAL ERGONOMICS: PHYSICAL STRESS ON THE WORKER

Relationship of Work Pace to Worker Physiological Cost in a Human-Machine Production Task 556
Biman Das

Body Composition (% Fat) and Heat Stress of Well Conditioned Young Adult Males 561
Michael W. Riley
David J. Cochran
Arthur J. Soundy

Lift Angle and Its Effect on Stresses to the Low-Back 565
Arun Garg

An Analysis of Isometric and Isokinetic Spinal Lifting Motions 570
William S. Marras

Development of a Human Atlas of Strengths 575
H.A. Hafez
C.F. Gidcumb
M.J. Reeder
M.Y. Beshir
M.M. Ayoub

MANAGEMENT SYSTEMS: HUMAN FACTORS, ORGANIZATION DESIGN, AND PRODUCTIVITY ISSUES [PANEL]

Human Factors, Organizational Design, and Productivity: Alternative Management Systems 580
Ogden Brown, Jr.
H.D. Plotzeneder
Andrew S. Imada
Dennis Coleman
Arnold F. Kanarick

COLOR IN VISUAL DISPLAYS

Expressions of Color Contrast as Equivalent Achromatic Contrast 581
David L. Post
Edward B. Costanza
Thomas M. Lippert

*Abstract Only
**Manuscript Not Available For Publication

Redundancy in Coding of a Visual Display as Assessed by a Signal Detection Paradigm 586
Lawrence J. Najjar
Michael J. Patterson
Gregory M. Corso

LED Color Discrimination by Males with Normal and Deficient Color Vision ..... **
Mary Carol Day

A Design Tool for Color Displays 589
Robert C. Carter

Gender Differences in Response to Ambient Color, Task Complexity and Presence of Evaluative Others 590
Daniel J. Pond

Effects of Color on Legibility of Displayed Text 595*
Catherine G. Wolf

TRANSFER OF TRAINING AND FLIGHT SIMULATORS

Tactical Ground Attack: On the Transfer of Training from Flight Simulator to Operational RED FLAG Range Exercise 596
Ronald Hughes
Rebecca Brooks
Douglas Graham
Ray Sheen
Tom Dickens

Subjective Performance Measures in the Test and Evaluation of Simulator Training Scenarios 601*
Byron J. Pierce

Gender Differences and Cognitive Abilities in the Transfer of Training of Basic Flying Skills 602
Thomas M. McCloy
John F. Swiney

Companion Trainer Aircraft: Aspects of Dual Qualification 605
Thomas H. Killion

Companion Trainer Aircraft: Concept Definition and Evaluation 610
Robert T. Nullmeyer

COMPUTER SYSTEMS: TEXT EDITING AND DATA ENTRY

Choosing the Right "Bit Pad": Human Factors Aspects of Digitizing Tablet Size 615*
James L. Knight, Jr.

Validation of User Models for Interactive Editing 616
Lisa J. Folley
Robert C. Williges

The Effect of VDT Command Line Location on Data Entry Behavior 621
Richard E. Granda
Richard C. Teitelbaum
Gregory L. Dunlap

Operator Corrections During Text Entry with Word Processing Systems 625
Alan S. Neal
William H. Emmons

An Experimental Evaluation of Input Field and Cursor Combinations 629
Ricky E. Savage
James K. Habinek
Nancy J. Blackstad

Keying Logics for Alphanumeric Keyboards and Human Performance 634
Larry C. Butterbaugh

WORKLOAD ASSESSMENT METHODOLOGY: THE AIR FORCE R&D PROJECT

Survey of Workload Requirements of Air-to-Ground Tactical Operations: Methodology and Results ..... **
Jonathon H. Greene
Christopher J. Arbak

An Individual Differences Approach to SWAT Scale Development 639
Gary B. Reid
F. Thomas Eggemeier
Thomas E. Nygren

Subjective Workload Assessment in a Memory Update Task 643
F. Thomas Eggemeier
Mark S. Crabtree
Jennifer J. Zingg
Gary B. Reid
Clark A. Shingledecker

Standardized Tests for the Evaluation and Classification of Workload Metrics 648
Clark A. Shingledecker
Mark S. Crabtree
William H. Acton

Transient Evoked Potential and Eye Movement Recordings During Simulated Emergencies 652
Glenn F. Wilson
Robert D. O'Donnell

Workload Assessment: Some Oculometric Considerations – The Eyeblink ..... **
J.A. Stern
L.C. Walrath
R. Goldstein

*Abstract Only
**Manuscript Not Available For Publication

HUMAN FACTORS IN THE NUCLEAR POWER INDUSTRY

The Integration of Human Factors Methodology into Nuclear Power Plant Control Room Reviews 654
Michael E. Maddox
Michael C. Brickey

Comparison of US and UK Practices and Philosophies for Nuclear Plant Control Room Design 659
Les Ainsworth

Human Reliability and Fault Tree Analysis 664
Catherine Stewart

Task Analysis of Nuclear Power Plant Control Room Crews: Data Collection Approach and Methodology 668*
Donald C. Burgy
William J. Newell
Harold P. Van Cott

Response Times of Nuclear Power Plant Operations: Comparison of Field and Simulator Data 669
A.N. Beare
R.E. Dorris
E.J. Kozinsky

A Technique to Analyze Human Performance in Training Simulators 674*
D.D. Woods
E. Hollnagel

PRODUCT DESIGN NEEDS FOR THE ELDERLY CONSUMER [PANEL]

Product Design Needs for the Elderly Consumer 676
Frederick H. Rohles, Jr.
John Kreifeldt
Jerry Duncan
Ben Dickerson
Arnold Small

HUMAN FACTORS JOB-DESCRIPTION: SURVEY RESULTS AND FORUM

HFS Job Description Survey: Where We Work, What We Do 677
Mark S. Sanders

HFS Job Description Survey: Job Dimensions, Satisfaction, and Motivation 682
Mark S. Sanders

HFS Job Description Survey: The Question of Gender 687
Jacqueline V. Downing

HFS/IEEE-SMC PLENARY SESSION INVITED PRESENTATION:

Critical Human Factors Issues in Nuclear Power Generation and a Recommended Comprehensive Long Range Plan 692
Charles O. Hopkins
Harry L. Snyder

HUMAN FACTORS IN PRODUCT DEVELOPMENT: COMPUTERS

Computer System Response Time and Psychophysiological Stress II 698
Stuart Martin Weiss
George Boggs
Mark Lehto
Sogand Shodja
David J. Martin

Editing with Contextual and Screen-Oriented Cursors 703
Kenyon I. Hicks
Arthur Keller

Color Your Computer Gray 708
Michael A. Nelson

Legibility Comparison of 7 by 7 and 7 by 9 CRT Character Dot Matrices 710
John H. McTyre

Development and Testing of the Operator Training Package for a Small Computer System 715
Peter J. Kennedy

Testing Small System Customer Set-Up 718
James R. Lewis

HUMAN FACTORS AS AN AGENT OF CHANGE

A Handbook of Human Performance 721*
Dudley G. Letbetter

Where and What are the Data in Human Factors? 722
David Meister

A Human Engineering Approach to the Enhancement of Operational Systems 727
Kenneth A. Schulz
Steven M. Pine

Integrating Human Factors Into Product Development Within Industry 731
Novia Weiman

Organizational Considerations in the Design and Implementation of Computerized Decision Support Systems 733
Dan Zakay

*Abstract Only
**Manuscript Not Available For Publication

Consumer Product Design Projects for Human Factors Classes 735
John G. Kreifeldt

THE ROLE OF THE OPERATOR IN THE CONTROL ROOM OF THE FUTURE [PANEL]

The Role of the Operator in the Control Room of the Future 740
Thomas R. Edman
L. Bainbridge
Roger Kisner
H. Zwaga
W. Rouse
J. Rijnsdorp

SIMULATION FIDELITY AND NEW TECHNOLOGY IN TRAINING

Fidelity of Simulation vs. Transfer of Training on a Maintenance Trainer 741
L. Bruce McDonald
Grace P. Waldrop
Richard Reynolds

Training Device Fidelity and Transfer of a Perceptual-Motor Skill 746*
David R. Baum
Sharon L. Riedel
Robert T. Hays

Performance Tests for Repeated Measures: Moran and Computer Batteries 747
Alvah C. Bittner, Jr.
Robert C. Carter
Michele Krause
Robert S. Kennedy
Mary M. Harbeson

Command-Set and Presentation Method in the Training of Telidon Operators 752
M. Francas
D. Goodman
J. Dickinson

Development of a Generic Operator Aiding and Training System 757*
Terrance G. Hanson

New Technology for Training: An Evaluation of the Air Controller Exerciser (ACE) 758
Michael E. McCauley
Robert W. Root
Frederick A. Muckler

HUMAN FACTORS TECHNOLOGY ON BEHALF OF OLDER ADULTS [PANEL]

Technology on Behalf of Older Adults ..... **
Arnold M Small
Sara J. Czaja
James Fozard
Marg Bartosek
H. McIlvaine Parsons
David B.D. Smith
Margaret Hubbard Jones
Jan Moraal
H. Asuman Kijak

HUMAN FACTORS ISSUES IN TELEOPERATOR AND ROBOT DEVELOPMENT

Remote Systems: Some Human Factors Issues in Teleoperator and Robot Development: An Interactive Session 763*
Margaret M. Clarke

Space Related Teleoperator Development 763*
Nicholas Shields, Jr.

Critical Research Issues in Stereoscopic Displays Employed in an Undersea Environment 763*
Ross L. Pepper

Kinesthetic Issues in Remote Task Performance 764*
Stephen J. Handel

Human Factors in Teleoperator Control-Display Design 764*
Margaret M. Clarke

Experiments in Supervisory Control of Teleoperators 764*
Thomas B. Sheridan

Human Interaction with Robotic Systems 765*
John Garin

Controllability of Remotely Piloted Spacecraft with Delayed Feedback 766*
A.M. Ray
A.K. Wildgen
D.J. Sexton

DISPLAY RESEARCH POTPOURRI

User-Computer Interface Design of a Complex Tactical Display Terminal 768
Gary I. Davis
Warren S. Badger

Effect of Perceived Threat on Avoidance Maneuvers Selected While Viewing Cockpit Traffic Displays 772
J.D. Smith
Stephen R. Ellis

Facility Requirements for Cockpit Traffic Display Research 777
Sheryl L. Chappell
John G. Kreifeldt

**Abstract Only*
***Manuscript Not Available For Publication*

Advanced Head Up Display Development Experiences 782*
W.D. Smith

Flight Operations Safety Monitoring Effects on the Crew Alerting System 783
D.C. Hanson
G.P. Boucek
W.D. Smith
J.F. Hendrickson
S.F. Chikos
W.W. Howison
B.L. Berson

SYMPOSIUM ON HUMAN FACTORS STANDARDS AND GUIDELINES

Symposium on Human Factors Standards and Guidelines 788
Martin G. Helander
William B. Knowles
H. Juptner
Gerald Chaikin
Forrest E. Crowell
Ernest J. Conway
Frederick A. Muckler
James P. Jenkins

SAFETY: HUMAN FACTORS IN THE NUCLEAR POWER INDUSTRY

Human Errors, Injuries and Accidents – A Review and Analysis ..... **
Ernest J. Conway
Frederick A. Muckler
James M. Peay

An Evaluation of Nuclear Power Plant Operator Performance Using a Safety Parameter Display System 789
Robert L. Kershner
Jack W. Gebhard
Eugene B. Silverman
George Pannel

A Data Bank for Human Related Events in Nuclear Power Plants 794
A. Mohsen M. Metwally
Zeinab A. Sabri
S. Keith Adams
Abdo A. Husseiny

Quantitative Evaluation of Human Reliability for Operating Tasks in Nuclear Power Plants 799
A. Mohsen M. Metwally
Zeinab A. Sabri
S. Keith Adams
Abdo A. Husseiny

COGNITIVE PROCESSES: A POTPOURRI II

Short-Term Memory and Dual Task Performance 803
Joan E. Regan

The Costs of Non-Simultaneity of Action 808*
D. Goodman
J.A.S. Kelso
D.L. Southard

Individual Differences and Stimulus Discriminability in Visual Comparison Reaction Time 809
David A. Dupree
Christopher D. Wickens

The Effects of Exposure Time and Retention Time on Location Memory in Visual Information Processing 812
Leighton L. Smith
D.H. Liles

The Effects of Noise on Performance of a Visual Discrimination Task 816
Valerie J. Gawron

Repeated Measures of Information Processing 818
Mary M. Harbeson
Robert S. Kennedy
Michele Krause
Alvah C. Bittner, Jr.

A DIVERSITY OF TRAINING ISSUES

Development of a Scoring Metric for Air-to-Air Combat Engagements 823*
Steven T. Breidenbach
Anthony P. Ciavarelli

Development and Validation of a Performance Measurement System for Air-to-Air Combat 824*
Anthony P. Ciavarelli
Steven T. Breidenbach

Development of Sensitive Performance Measures for Selection of Crews for Flight Training 825
Edward M. Connelly
Brian D. Shipley, Jr.

Simulation and Training for Aircraft Carrier Landings: An Economical Multifactor Approach 830
Daniel P. Westra

An Analytic Process Method for Defining Appropriate Measures of Systems' Performance and Effectiveness 835
Dorothy L. Finley
H.C. Strasel
Richard L. Bloom
John F. Oates, Jr.

Developing Training Devices with an Effective Capability for Training Management and Readiness Assessment 840
H.C. Strasel
Dorothy L. Finley
John K. Hawley

*Abstract Only
**Manuscript Not Available For Publication

Standards for Time Taken in Self-Paced Training 845
Donald L. Zink

ERGONOMICS AND HIGH TECHNOLOGY

A Model for Predicting Human Error in the Nuclear Industry 850
Neville Moray

Consideration of Economical and Socio-Psychological Factors in the Implementation of Computer-Aided Manufacturing 853
Biman Das

Human Factors Concerns in Industrial Robot Applications 858
S. Deivanayagam

Methodologies for Visual Inspection Research and Development of Inspection Robot 863
Kageyu Noro
Akinori Komatsubara
Yoshimi Yokomizo

An RSM Investigation of Defect Rate and Other Variables Which Influence Inspection 868
Les Ainsworth

Task Analysis of Spent Nuclear Fuel Operations Technicians 873
Stephen B. Hottman
Robert P. Bateman

ADVANCED DISPLAY CONCEPTS: NUCLEAR POWER PLANT APPLICATIONS [PANEL]

Advanced Display Concepts for Nuclear Power Plant Applications 878
H.P. Van Cott
L.F. Hanes
W.F. Banks
H.L. Parris
W. Coley
J.P. Jenkins

IMPACTS OF TECHNOLOGY UPON ORGANIZATIONAL DESIGN AND MANAGEMENT [PANEL]

Impacts of Technology Upon Organizational Design and Management 879
Ogden Brown, Jr.
Sara J. Czaja
Glen R. Gallaway
Hal W. Hendrick
T.J. Springer
Robert A. Vecchiotti

VISUAL FACTORS IN AIRCREW TRAINING

Applied Human Factors and Its Impact on a Helicopter Night Vision System Configuration 880
Grace P. Waldrop
L. Bruce McDonald
William A. Breitmaier
T. Mitchell

Visual Channel Sensitivity and Pilot Performance in a Flight Simulator 885
Ronald Kruk
David M. Regan
Ken I. Beverley
Thomas M. Longridge

Dynamic Perception of Computer Generated Visual Information in an Altitude Control Task 890
Tamara Mitchell

Tailoring Day Scenarios for Night Simulation of Advanced Aircraft Systems. ..... **
John C. Simons
Stephen B. Hottman

MAKING PERSONNEL AND TRAINING REQUIREMENTS INFLUENCE DESIGN [PANEL]

How Can Personnel and Training Requirements Have an Influence on Design of Systems? 895
George N. Graine
James D. Baker
John M. Richardson
Merlin K. Malehorn
Lawrence M. White
David Meister

ADVANCES IN SIMULATION TECHNOLOGY

Development of a Human Factors Research Laboratory for Off-Road Vehicle Operator Workstation Design 896
J.R. Duncan
E.L. Wegscheid

Visual Simulation Requirements for Aircraft Aspect Recognition at Real World Distances 901
Robert S. Kennedy
Stanley C. Collyer
James G. May
William P. Dunlap

Peripheral Cues and Color in Visual Simulation 906
Conrad L. Kraft
Charles D. Anderson
Charles L. Elworth

*Abstract Only
**Manuscript Not Available For Publication

ALCOHOL EFFECTS ON PERFORMANCE AND PRODUCTIVITY

Alcohol, Task Difficulty, and Incentives in Drill Press Operation 911
Robert A. Flax
Dennis L. Price

Effects of Maintained Blood Alcohol Concentration and Task Complexity on the Operation of a Punch Press Simulator 916
William E. Barbre
Dennis L. Price

Effects of Alcohol Ingestion and Workload on Quality and Productivity for a Paced and Unpaced Assembly Task 921
Djamel E. Tergou
Dennis L. Price

Type of Task Practice and Time-Sharing Activities Predict Performance Deficits Due to Alcohol Ingestion. 926
Arthur D. Fisk
Walter Schneider

SURVIVAL SHELTER ENVIRONMENT: HUMAN FACTORS ISSUES [PANEL]

The Survival Shelter Environment: Implications for Human Factors 931
Frederick H. Rohles Jr.
Stephan A. Konz
Donald Bettge

RESEARCH IN DYNAMIC MANUAL CONTROL

Tracking Bandwidth Manipulations and Processing Resource Cost 932
William L. Derrick
Thomas M. McCloy

Pseudo-Quickening: A New Display Technique for the Control of Higher Order Systems 936
Richard Gill
Christopher D. Wickens
Emanuel Donchin
Robert E. Reid

Some Human Factor Aspects of Computer Controlled Transportation Systems 940
Galen A. Holcomb

The Measurement of Three-Dimensional Hand Motion by the Use of V.T.R. 945
Nobuo Miyashiro

F-18 HUMAN ENGINEERING PROGRAM: A RETROSPECTIVE VIEW

F-18 Human Engineering Program – A Retrospective View 950
Lloyd Hitchcock
Stephen C. Merriman
Julian P. Moore
Peter Field

COMPUTER-AIDED HUMAN ENGINEERING

An Outline of a Series of Diversified Process Simulation (DIPOS) Experiments 954
Eric Hollnagel

Attribute Requirements for a Simulated Flight Scenario Microcomputer Test 959
R.H. Shannon
M. Krause
R.C. Irons

Human Operator Simulation in the Cognitive Domain 964
F.A. Glenn
A.L. Zaklad
R.J. Wherry, Jr.

Validating CAR: A Comparison Study of Experimentally Derived and Computer-Generated Reach Envelopes 969
Regina Harris
Jay Bennett
James Stokes

EVAC Computer Simulation of Personnel Performance in Airplane Evacuation 974
Donald L. Parks
Robert A. Ostrand

Application of PROMETHEUS III, Simulation of Human Crash Dynamics for Energy Absorption Studies 979
David W. Twigg
Donald L. Parks

COMPUTER SYSTEMS: PROGRAMMIMG LANGUAGES

An Empirical Evaluation of Language-Tailored PDLs 984
Deborah A. Boehm-Davis
Sylvia B. Sheppard
John W. Bailey

The Effect of Problem Complexity, Computer Power, and Feedback Aids on the Accuracy and Completeness of Computer Programs 989
Edward M. Connelly

*Abstract Only
**Manuscript Not Available For Publication

Roadmaps versus Roadsigns: Which is the Better Metalanguage? 994
Barbara S. Isa
Alan S. Neal
R. James Evey
Bernard W. McVey

Use of Appropriate Looping Structures: Expert vs. Novice 999
Kathleen Swigger
Layne Wallace

HUMAN COGNITION IN MAN-MACHINE SYSTEMS [PANEL]

Human Cognition in Man-Machine Systems 1004
Chris R. Hale
Philip V. Kulwicki
Carroll N. Day
David L. Kleinman
Earl Hunt
Marcy Lansman
George A. Frekany
Bertram W. Cream
Gary A. Klein

VISUAL PERFORMANCE: PILOT INSTRUMENT SCANNING

Contingency in Visual Scanning of Cockpit Traffic Displays 1005
Stephen R. Ellis

How a New Instrument Affects Pilots' Mental Workload 1010
Randall L. Harris, Sr.
John R. Tole
Arye R. Ephrath
A. Thomas Stephens

The Effectiveness of Using Real-Time Eye Scanning Information for Pilot Training 1014
Amos A. Spady, Jr.
Dennis H. Jones
Glynn D. Coates
Raymond H. Kirby

Author Index 1018

*Abstract Only
**Manuscript Not Available For Publication